Morkill, Anne <anne_morkill@fws.gov>

Cargill Pond Waterbird Survey results Sept 2012 - August 2013

1 message

Valoppi, Laura <laura_valoppi@usgs.gov> Mon, Mar 23, 2015 at 5:14 PM
To: Aaron O'Callaghan <aocallaghan@resourceslegacyfund.org>, Amy Hutzel <ahutzel@scc.ca.gov>, Anne Morkill <anne_morkill@fws.gov>, Ariel Ambruster <aambrust@ccp.csus.edu>, Brenda Buxton <Brenda.Buxton@scc.ca.gov>, Caleb Conn <Caleb.B.Conn@usace.army.mil>, Cheryl Strong <cheryl_strong@fws.gov>, Conrad Jones <conrad.jones@wildlife.ca.gov>, Greg Martinelli <gmartinelli@dfg.ca.gov>, John Bourgeois <John.Bourgeois@scc.ca.gov>, John Krause <john.krause@wildlife.ca.gov>, Korie Schaeffer <Korie.Schaeffer@noaa.gov>, Melisa Amato <Melisa_Amato@fws.gov>, Natalie C-Manning <Natalie.C-Manning@noaa.gov>, NNguyen <NNguyen@valleywater.org>, Pat Showalter <pshowalter@valleywater.org>, Patrick Ji <Patrick@acpwa.org>, Rachel Tertes <rachel_tertes@fws.gov>, Rohin Saleh <rohin@acpwa.org>

Summary of "Salt Pond Waterbird Survey Data Summary: September 2012 – August 2013" by J. Scullen, et al., San Francisco Bay Bird Observatory.

This report is added to the ftp site, it is not on the website.

This report summarizes bird survey data from Coyote Hills, Dumbarton, and Mowry salt pond complexes in the South San Francisco Bay. These salt ponds are owned by Don Edwards San Francisco Bay National Wildlife Refuge and managed for salt production by Cargill Salt. This report is based primarily on data collected by the San Francisco Bay Bird Observatory between September 2012 and August 2013, although previous years' data are also included in several areas to assess the relationship between bird abundance and brine quality (water level, salinity, pH, etc.). Researchers conducted high tide waterbird surveys, using a 250 square meter grid scale, in 22 Cargill-managed salt evaporation ponds, and documents species abundance, richness (number of bird species), and behavior. Species were grouped into guilds (dabbling ducks, diving ducks, Eared Grebes, fisheaters, gulls, herons and egrets, medium shorebirds, phalaropes, small shorebirds and terns) based on foraging methods and prey requirements. Brine quality, water level, and general water quality sampling was also conducted on each pond. Researchers analyzed bird/guild abundance by pond, complex, season and year. They defined seasons as fall (September, October, and November), winter (December, January, and February), spring (March, April, and May), and summer (June, July, and August). Data from September 2005 to August 2013 were included in the analysis. Analysis was focused on the winter season.

Between September 2012 and August 2013, 377,044 waterbirds were observed comprised of 63 species. Abundance distributions of most guilds were patchy, consistent with brine quality and salinity of the ponds varying widely (both seasonally and by pond), which had an impact on prey distributions and thus had different impacts on bird abundances depending on guilds. The Coyote Hills complex supported the highest proportions of divers, fisheaters, geese, gulls, herons and egrets, medium shorebirds and terns. Dumbarton complex contained 13.8% of all bird sightings, had 18.8% of the total study area, but contained 52% of the small shorebirds. Salinities were moderate to high (annual average exceeded 60ppt), with tendency for increased salinities in the eastern ponds. Mowry complex contained 40.6% of all waterbird sightings and comprised 42.9% of the total study area. Mowry complex supported the highest proportions of dabblers (51%), Eared Grebes (88%) and phalaropes (52%), though overall phalarope counts were low. The Mowry complex was characterized by two low salinity (an annual average of 0-60 ppt) ponds and four high salinity (an annual average exceeding 120 ppt) ponds; salinity increased as brine moved east within the system.

Researchers examined pond characteristics in relation to guild abundance. For dabbling ducks, they did not find any significant brine quality effects on dabbling ducks, indicating that this guild may be flexible with respect to different water quality parameters.

Diving ducks demonstrated a significant increase in abundance with increases in dissolved oxygen or water depth levels (water depth). These associations are likely tied to prey and foraging habitat availability, since low dissolved oxygen is detriment to prey survival, and shallow ponds are not ideal for diving. Additionally, diving ducks demonstrated a significant decrease in abundance with increases in salinity.

Eared Grebes were observed in the ponds with the highest salinity levels, showed a significant increase in abundance with increases in pH, salinity, or water depth values. Although the highest Eared Grebe counts were on higher salinity ponds, a high percentage of foraging birds were also observed on low to medium salinity ponds; and there was a significant decrease in abundance with increases in temperature. Fish in the South Bay ponds cannot survive in salinities greater than 80 ppt, which limits the ponds where they can expected to be observed.

Fisheaters showed a significant increase in abundance with increases in water depth values, and a significant decrease in abundance with increases in dissolved oxygen or salinity. Increased water depth provide deeper foraging habitat for fisheaters.

Tern abundances were low overall. Terns showed no significant changes with any brine quality parameter. Because terns were in low abundance during the winter, they may not have been able to capture the significance of any brine quality parameters due to low sample size.

Gulls showed a significant increase in abundance with increases in pH, salinity, or water depth levels. Gulls were observed foraging in high numbers at medium and high salinity ponds likely on the abundance of brine shrimp and brine flies at these locations. Researchers observed breeding California Gull colonies on levees and islands at N2A, N3A, N4AB, N6, N7, N9, M1, M2, M3, M4, and M5. Two nearby landfills offer foraging opportunities: Tri Cities Landfill and Newby Island Landfill. In 2013, numbers of breeding California Gulls in the South Bay reached an all-time high of 53,458.

Medium shorebirds showed a significant increase in abundance with increases in salinity or water depth levels. The positive association with water depth levels is likely not a linear relationship, and may be due to prey abundance and distribution in varying water depths, or perhaps related to increased island formation and isolation from predators. Bathymetric data for each pond is needed to better understand the relationship between water depth level, pond depth and shorebird use. Many shorebird species in the San Francisco Bay use salt ponds as high tide refugia for roosting and foraging.

Small shorebirds showed a significant increase in abundance with increases in salinity or temperature and a significant decrease in abundance with increases in pH. As noted for medium shorebirds, islands and levees in the salt ponds may offer high tide refugia for shorebirds in the San Francisco Bay. Small shorebird sightings have declined in recent years at the Cargill ponds, primarily due to reduced sightings at the Dumbarton complex. However, small shorebird increases have been reported during this period by Brand et al. (2011) at SBSPRP locations.

Heron and egret abundance was low overall, with fewer than 2,200 observations. Herons and egrets showed a significant decrease in abundance with increases in salinity or water depth values. Higher salinity levels (above

80 ppt) are generally detrimental to fish survival, and fish are a primary prey item for herons and egrets. Increased pond depths may allow fish to escape beyond the reach of herons and egrets, while shallow ponds may provide better (or simply a larger area of) foraging habitat.

Since the onset of this project in 2005, sightings of phalaropes have fluctuated widely (e.g., over 10,000 observations in the 2006-2007 study year, versus fewer than 1,000 in the 2009-2010 study year). It is difficult to know if habitat changes, sampling techniques or pond management practices are responsible for the fluctuations. In addition, phalaropes migrate through the Bay during a relatively short time period, and researchers may miss sampling ponds during peak phalarope migration by surveying the ponds only once per months, sampling techniques, or pond management practices are resulting in these observed fluctuations.

At some ponds high proportions of birds were observed on islands, levees, and other manmade structures which provided nesting or roosting habitat. Salinities at these ponds ranged from 0 – 60 ppt, with northern ponds being less saline than southern ponds.

In general, more advanced analyses are needed to tease apart complex temporal and spatial patterns operating at different scales within this dynamic system. Analyses considering both Cargill-managed ponds and SBSPRP (USGS surveyed) areas together will be especially informative. For example, examining annual decreases at Cargill-managed ponds coupled with corresponding increases at SBSPRP ponds (or vice versa) could indicate that the South Bay ponds operate as a single complex for certain species or guilds. In addition, quantifying local bird movement is important for assessing true bird abundances; further work in this area is warranted (for example by doing repeated counts at the same pond). For species, such as phalaropes which migrate through quickly, monthly bird counts may be insufficient for assessing true abundance. More frequent monitoring, every 2 – 3 days, during migration season may be required. Researchers also recommend additional resources be provided to understanding habitat selection – specifically the Cargill ponds do not have bathymetric data so variation in water depth over the area of a ponds cannot be determined. Researchers also recommend future studies examine the relationship between foraging and roosting behavior and brine quality to better understand habitat requirements.

As the SBSPRP progresses, these researchers advocate for a precautionary approach to waterbird management and a strategy that includes maintaining some of the ponds within the project footprint at a variety of salinity levels and water levels suitable for many different guilds. They recommend that special consideration be given to birds that prefer medium to high salinity ponds, such as phalaropes and Eared Grebes, since restoration activities have already reduced the prevalence of these habitat conditions and the remaining high salinity habitat at Cargill is managed for salt production rather than waterbird optimization. Creating or maintaining islands or undisturbed levees will provide potential nesting and roosting habitat for other species and guilds. As the restoration advances, continued monitoring of avian use of both Cargill-managed and SBSPRP ponds alike will be valuable in assessing progress toward the management target of maintaining current waterbird numbers. However, a landscape perspective may be needed to tease apart the multitude of factors affecting observed waterbird assemblages on the salt ponds and to interpret changes in bird numbers operating at different temporal and spatial scales

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Laura Valoppi
Lead Scientist
South San Francisco Bay Salt Pond Restoration Project
Western Ecological Research Center
U.S. Geological Survey
6000 J Street, Placer Hall, Suite 4001
Sacramento, CA 95819-6129

http://www.southbayrestoration.org/science

(916)278-3124